LONDON-WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA13 | Calvert, Steeple Claydon, Twyford and Chetwode

Data appendix (AQ-001-013)

Air quality

November 2013

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Department for Transport

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1 Introduction

1.1.1 The air quality appendices for the Calvert, Steeple Claydon, Twyford and Chetwode community forum area (CFA 13) comprise:

- discussion of the policy framework (Section 2);
- baseline air quality data (Section 3);
- dust impact evaluation and risk rating (Section 4); and
- air quality assessment - road traffic (Section 5).

1.1.2 Maps referred to throughout the air quality appendix are contained in the Volume 5, Air Quality Map Book.

2 Policy framework

2.1.1 Policies EN3 and EN5, and saved policy ENV1, of the Cherwell Non-Statutory Local Plan[1] seek to resist development that will give rise to a material adverse impact on air quality. The Aylesbury Vale Local Plan[2] does not have any policies that address air quality. Policy GP.8 is an overarching policy, however, seeking to protect public amenity, whilst Saved Policy GP.95 seeks to protect the amenities of existing occupiers.

2.1.2 Policy BSC 8 of the Cherwell Proposed Submission Local Plan 2012[3] relates to the improvement of air quality within the district, whilst Policy ESD 10 requires air quality assessments to be conducted for development proposals that will have a significant adverse impact on biodiversity by generating an increase in air pollution.

[1] Cherwell District Council (2011) *Cherwell Non-Statutory Local Plan 2011.*
[2] Aylesbury Vale District Council (2004) *Aylesbury Vale District Local Plan 2004.*
[3] Cherwell District Council (2012) *The Cherwell Local Plan Proposed Submission August 2012.*

3 Baseline air quality data

3.1 Existing air quality

Local authority review and assessment information

3.1.1 Aylesbury Vale and Cherwell District Councils carry out monitoring within their areas in order to help with assessing air quality and to identify any areas where air pollution is close to or already exceeding air quality standards.

3.1.2 As part of its review and assessment process, Aylesbury Vale District Council has declared an air quality management area (AQMA) for exceedances of the annual mean nitrogen dioxide (NO_2) standard at three areas within the town of Aylesbury. These are outside the study area.

3.1.3 Cherwell District Council has identified a number of areas within its district where air quality does not meet air quality standards, in particular in Bicester and in Banbury[4]. The council has declared an AQMA at Hennef Way, Banbury, but this is outside the study area. Bicester has not been declared as an AQMA, although NO_2 concentrations are not meeting the standard along the B4100 leading into the town centre. Concentrations in other parts of Bicester are well within the standard and current measurements show that they are approximately at 50% of the standard.

3.1.4 From local authority information, baseline concentrations of NO_2 and particulate matter such as PM10 and PM2.5 in the study area are likely to be in compliance with air quality standards, given low background concentrations across the district, although higher concentrations will occur in built-up areas.

Local air quality monitoring data

3.1.5 The pollutant concentrations can be compared to the air quality standards:

- 40µg/m^3 as an annual mean for NO_2 and PM10;
- 200µg/m^3 one-hour mean for NO_2 not to be exceeded more than 18 times a year (equivalent to the 99.8th percentile of the one-hour mean);
- 50µg/m^3 24-hour mean for PM10 not to be exceeded more than 35 times a year (equivalent to the 90.4th percentile of the 24-hour mean); and
- 25µg/m^3 as an annual mean for PM2.5.

3.1.6 There are no monitoring locations within the study area that are relevant to this assessment.

[4] AEA Technology (2009) *Air Quality Updating and Screening Assessment for Cherwell District Council* 2009.

Background pollutant concentrations

3.1.7 Estimates of background air quality have been taken from Department for Environment, Food and Rural Affairs (Defra) maps[5]. Background annual average NO2 concentrations are within the air quality standard of 40µg/m^3 throughout the study area with annual mean concentrations in the range 9.2µg/m^3 - 10.2µg/m^3 in 2012. Background annual average PM10 concentrations are within the air quality standard of 40µg/m^3 throughout the study area, with annual mean concentrations in the range 14.6µg/m^3 - 15.9µg/m^3 in 2012.

Local emission sources

3.1.8 The main source of pollution in the study area is road vehicles. Major roads include the A421.

3.2 Receptors

Human

Construction phase

3.2.1 Potential receptors are primarily those residential properties close to construction activity and alongside roads where traffic flows will change as a consequence of construction activity. Notable receptors in relation to construction activity include properties on Brackley Lane, School Hill, Rosehill Farm, Sunflower Farm, The Hermitage, Manthorn Farm, Lake Farm, Stone Court Farm, Pear Tree House and School End. Notable receptors near roads where traffic flows will change are Cheshire Cottages, 8 School Hill, 60 West Street, The Bungalow and Gawcott Fields. Receptors at greatest risk of dust effects are indicated in Map AQ-02-013-01 (Volume 5, Air Quality Map Book).

Operational phase

3.2.2 Once the Proposed Scheme is operational, only receptors located on roads where possible increases in operational traffic will occur or where road alignment will change by greater than 5m have the potential to be affected. Notable receptors in the latter category include Rosehill Farm near Addison Road.

Ecological

Construction phase

3.2.3 No ecological receptors in the study area will be affected by air quality as a result of the construction phase.

Operational phase

3.2.4 No ecological receptors in the study area will be affected by air quality as a result of the operational phase.

[5] Department for Environment, Food and Rural Affairs (Defra) (2012) *Defra Background Pollutant Concentration Maps*; http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html; Accessed: July 2013

4 Dust impact evaluation and risk rating

4.1.1 The following sections provide details of the assessment of construction impacts following the Institute of Air Quality Management (IAQM) guidance[6]. Where considered useful to identify receptors and their relationship to the construction activity, a specific figure is provided. On-site haul movements were assessed explicitly.

4.1.2 The dust assessment criteria for the haul route are based on those for earthworks, as set out in the IAQM guidance. This emission phase was considered to be the most applicable, as the assessment of impacts from earthworks will depend, in part, on the passage of vehicles over open surfaces. It was assumed that significant effects would not occur beyond a distance of 50m from the haul route, again based on interpretation of the earthworks criteria, and that all areas of the haul route will be subject to more than 10 vehicle movements per day. On the basis of criteria for earthworks within the IAQM guidance, the dust emission class for the haul route is large. Wherever there are receptors within 50m of a haul route, the sensitivity of the receiving environment was derived using the IAQM guidance. The need for, and capability of, the local environmental management plan (LEMP) to control these dust emissions, as directed by the draft Code of Construction Practice[7] (CoCP), was then considered in forming the conclusion of the assessment.

Table 1: Evaluation and risk rating of construction activities

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft CoCP mitigation measures)	Principal justifications
Cuttings and embankments - Brackley Lane, School Hill, Rosehill Farm, Manthorn Farm, Sunflower Farm, The Hermitage and School End (Map AQ-02-013-01, Figure 13.1, Map AQ-02-013-02, Figures 13.5 to 13.8 (Volume 5, Air Quality Map Book))						
Demolition	Less than 20m	Medium	High	Medium	Negligible	1. Potentially dusty construction material. 2. Fewer than 10 receptors within 20m of

[6] Institute of Air Quality Management (IAQM), (2011), *Guidance on the assessment of the impacts of construction on air quality and the determination of their significance*
[7] Volume 5: Appendix CT-003-000

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft CoCP mitigation measures)	Principal justifications
						the site.
Earthworks	Less than 20m	Large	High	Medium	Negligible	1. Total site area greater than 10,000m^2. 2. Fewer than 10 receptors within 20m of the site.
Construction	Less than 20m	Large	High	Medium	Negligible	1. Use of dusty construction materials. 2. Fewer than 10 receptors within 20m of the site.
Trackout	Less than 20m	Medium	Medium	Medium	Negligible	1. Fewer than 100 heavy goods vehicles (HGVs) on road. 2. Fewer than 10 receptors within 20m of the site.
Haul route	Less than 50m	Large	High	Medium	Negligible	1. More than 10 HGV movements per day.
The Calvert infrastructure maintenance depot - Pear Tree House, Stone Court Farm and Lake Farm (Map AQ-02-013-01, Figure 13.2 to 13.4 (Volume 5, Air Quality Map Book))						
Demolition	N/A	N/A	N/A	N/A	N/A	No demolitions within 350m of receptors.
Earthworks	100-200m	Large	Medium	Low	Negligible	1. Total site area greater than 10,000m^2. 2. No receptors within 20m of the site.
Construction	100-200m	Large	Medium	Low	Negligible	1. Use of dusty construction materials.

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with draft CoCP mitigation measures)	Principal justifications
						2. No receptors within 20m of the site.
Trackout	Less than 20m	Medium	Medium	Medium	Negligible	1. Fewer than 100 HGVs on road. 2. Fewer than 10 receptors within 20m of the site.
Haul route	N/A	N/A	N/A	N/A	N/A	No receptors within 50m of the haul route.

Table 2: Summary of construction dust impacts and effects

Location	Magnitude of impact	Effect of dust-generating activities	Additional mitigation
Cuttings and embankments	Negligible	Not significant	None required
The Calvert infrastructure maintenance depot	Negligible	Not significant	None required

5 Air quality assessment - road traffic

5.1 Overall assessment approach

5.1.1 The air quality assessment for road-related emissions has considered the possible use of different approaches based on the scale of changes in traffic and road alignment. Where the Design Manual for Roads and Bridges[8] (DMRB) thresholds detailed in the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1) are not exceeded, no additional assessment is required as the air quality impacts will be minimal. If these thresholds are breached, then a quantitative assessment has been carried out.

5.1.2 Where the road configuration is straightforward and the air quality within standards, the DMRB screening method has been used to predict changes in air quality. Professional judgment has been used to select the appropriate tool for each area.

5.1.3 In this study area the DMRB screening method was considered to be a suitable tool for the assessment.

5.2 Construction traffic model

5.2.1 Roads assessed for construction traffic are detailed in Volume 5: Appendix TR-001-000. Scenarios assessed were based on maximum traffic flows on affected roads during the construction phase of the Proposed Scheme, even though some of these may be for shorter durations than one year.

[8] Highways Agency, (2007), *The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07)*

Receptors assessed

5.2.2 The additional traffic and the need for road diversions have the potential to change air quality for some receptors. During the construction phase, all road links identified for assessment will experience increases in traffic numbers. Where DMRB criteria for undertaking a local air quality assessment were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are presented in Table 3 and in Map AQ-01-013 (Volume 5, Air Quality Map Book).

Table 3: Modelled receptors (construction phase)

Receptor	Description/location	Ordnance Survey coordinates
13-1	Chershire Cottages (School Hill (west of Perry Hill))	468025, 224701
13-2	8 School Hill (Perry Hill (north of School Hill))	468120, 224691
13-3	60 West Street (West Street (east of Perry Hill))	469346, 226881
13-4	The Bungalow (Perry Hill (north of West Street))	467244, 227443
13-5	Gawcott Fields (Buckingham Road/Gawcott Road)	468919, 232971

Background concentrations

5.2.3 The background concentrations used in the assessment are shown in Table 4 taken from the Defra maps.

Table 4: Background 2017 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations (µg/m^3)		
	NOx	NO2	PM10
13-1 Chershire Cottages	10.9	7.9	14.5
13-2 8 School Hill	10.9	7.9	14.5
13-3 60 West Street	11.1	8.1	14.7
13-4 The Bungalow	10.5	7.7	14.2
13-5 Gawcott Fields	12.0	8.8	14.9

Design Manual for Roads and Bridges model results

5.2.4 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using the DMRB methodology. The magnitude of change and impact descriptor for the five human receptors identified are derived following the Environmental Protection UK (EPUK) methodology[9].

Table 5: Summary of DMRB annual mean NO_2 results (construction phase)

Receptor	Concentrations (µg/m^3)			Change in concentrations (µg/m^3)	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
13-1	9.9	8.5	9.0	0.4	Small increase	Negligible
13-2	10.0	8.3	11.2	2.9	Medium increase	Negligible
13-3	10.1	8.5	9.2	0.8	Small increase	Negligible
13-4	9.5	8.0	8.0	<0.1	Imperceptible increase	Negligible
13-5	11.3	9.5	11.4	1.9	Small increase	Negligible

Table 6: Summary of DMRB annual mean PM10 results (construction phase)

Receptor	Concentrations (µg/m^3)			Change in concentrations (µg/m^3)	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
13-1	15.3	14.5	14.6	0.1	Imperceptible increase	Negligible
13-2	15.3	14.5	14.8	0.3	Imperceptible increase	Negligible
13-3	15.5	14.7	14.9	0.2	Imperceptible increase	Negligible

[9] Environmental Protection UK (EPUK), (2010), *Development Control: Planning for Air Quality*

Receptor	Concentrations (µg/m^3)			Change in concentrations (µg/m^3)	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
13-4	15.0	14.2	14.3	<0.1	Imperceptible increase	Negligible
13-5	15.8	15.1	15.2	0.2	Imperceptible increase	Negligible

Assessment of significance

5.2.5 The overall magnitude of impact of the Proposed Scheme is negligible at worst for NO2 and PM10 during construction. Pollutant concentrations will remain well within air quality standards with and without the Proposed Scheme. AQMAs lie outside the study area.

5.2.6 The changes in air quality at worst-case receptors during the construction phase will not cause significant effects for receptors since the adverse impact is negligible, taking into account background air quality and air quality standards.

5.2.7 In certain circumstances a qualitative assessment has been undertaken. This was the case for the A41 (between Bicester and Grendon Underwood), which was identified as meeting the criteria for assessment due to an increase in traffic during construction. This qualitative assessment concluded that the impact is expected to be slight adverse at worst for NO2 and negligible for PM10, on the basis of the distance to the receptor from the roads, the existing traffic flows on the construction routes and the fact that baseline air quality is within air quality standards. The effect on air quality due to construction traffic will not be significant.

5.2.8 This was also the case for a short stretch of Addison Road, between the temporary rail sidings at Calvert across the Bicester to Bletchley Line and the sustainable placement. This qualitative assessment concluded that the impact is expected to be negligible for NO2 and PM10, on the basis of the distance of the receptor, Rosehill Farm, from the roads. The effect on air quality due to construction traffic will not be significant.

5.3 Operational traffic model

5.3.1 Operational traffic data on which this assessment is based are detailed in Volume 5: Appendix TR-001-000. Scenarios assessed were based on maximum traffic on affected roads during the operational phase of the Proposed Scheme.

Receptors assessed

5.3.2 For all road links where DMRB criteria for local air quality were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest pollutant concentrations along the roads, including closest to junctions or to the road itself. All the roads within the study area identified and assessed were as a result of road-realignment. Receptors assessed are presented in Map AQ-01-012 (Volume 5, Air Quality Map Book). No receptors were sufficiently close to Perry Hill to require assessment. Rosehill Farm is the receptor most affected by the realignment of Addison Road.

Table 7: Modelled receptors (operational phase)

Receptor	Description/Location	Ordnance Survey coordinates
13-6	Rosehill Farm (Addison Road (south of rail line))	469593, 225779

Background concentrations

Table 8: Background 2026 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations (µg/m^3)		
	NOx	**NO2**	**PM10**
13-6 Rosehill Farm	8.6	6.3	14.0

Design manual for Roads and Bridges model results

5.3.3 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using the DMRB methodology. The magnitude of change and impact descriptor are derived following the EPUK methodology[7].

Table 9: Summary of DMRB annual mean NO_2 results (operational phase)

Receptor	Concentrations (µg/m^3)		Change in concentrations (µg/m^3)	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
13-6	6.4	6.4	<0.1	Imperceptible increase	Negligible

Table 10: Summary of DMRB annual mean PM10 results (operational phase)

Receptor	Concentrations (µg/m^3)		Change in concentrations (µg/m^3)	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
13-6	14.0	14.0	<0.1	Imperceptible increase	Negligible

Assessment of significance

5.3.4 The overall magnitude of impact is negligible for both NO2 and PM10 at Rosehill Farm during the operation of the Proposed Scheme. Pollutant concentrations will remain well within air quality standards with and without the Proposed Scheme. AQMAs lie outside the study area.

5.3.5 The changes in air quality at the most affected receptor during the operational phase will not cause significant effects since the adverse impact is negligible, taking into account background air quality and air quality standards.

6 References

AEA Technology (2009) *Air Quality Updating and Screening Assessment for Cherwell District Council*.

Aylesbury Vale District Council (2004) *Aylesbury Vale District Local Plan*.

Cherwell District Council (2011) *Cherwell Non-Statutory Local Plan*.

Cherwell District Council (2012) *The Cherwell Local Plan Proposed Submission August 2012.*

Department for Environment, Food and Rural Affairs (Defra) (2012) *Defra Background Pollutant Concentration Maps*; http://laqm.defra.gov.uk/maps/maps2010.html; accessed: July 2013.

Highways Agency (2007) *Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07)*

Institute of Air Quality Management (IAQM) (2011) *Guidance on the assessment of the impacts of construction on air quality and the determination of their significance*.